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Chang

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[54] **MOBILE TELEPHONE ANTENNA**

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[51] **Int. Cl.**[6] **H01Q 1/24**

[52] **U.S. Cl.** **343/702**; 343/895; 343/901

[58] **Field of Search** 343/702, 895, 343/745, 749, 752, 901; H01Q 1/24

[56] **References Cited**

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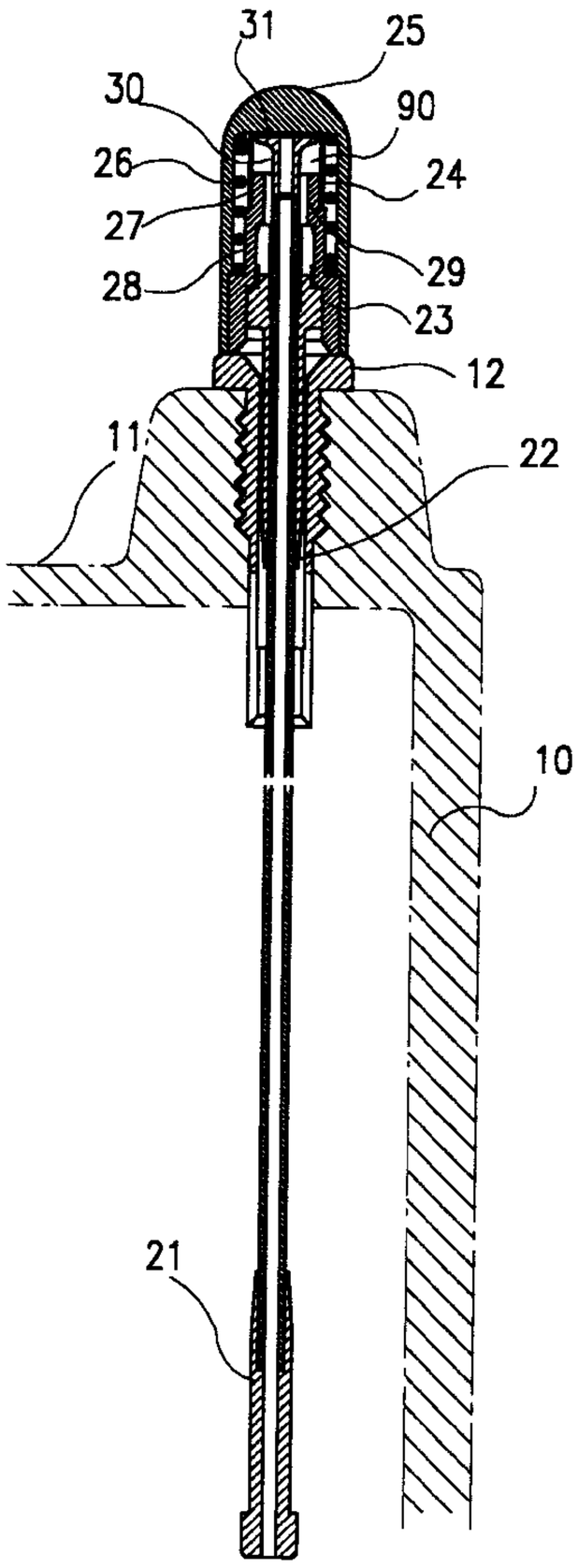
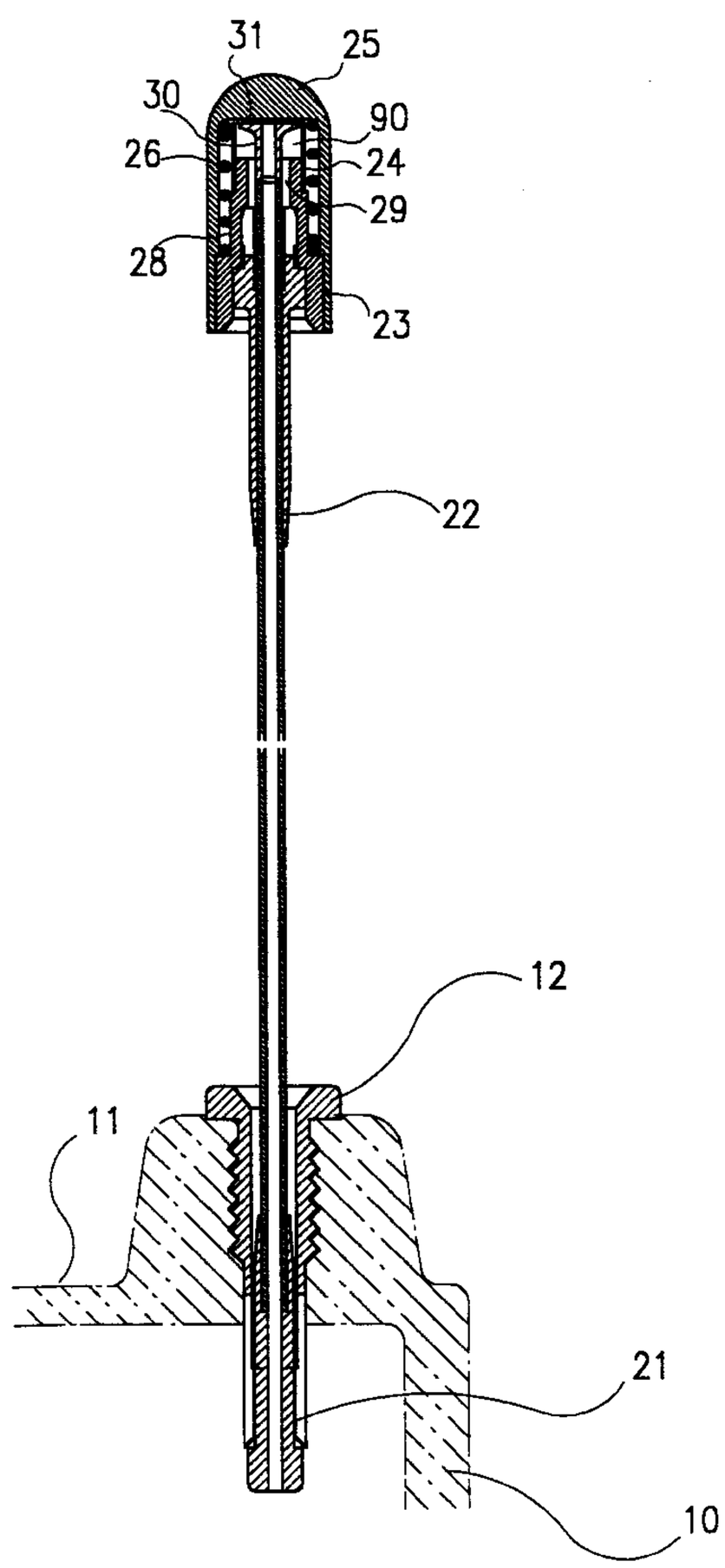
[57] **ABSTRACT**

A mobile telephone antenna including an alloy wire rod moved in a metal socket in a mobile telephone at the top, the alloy wire rod having a bottom end fixed with a first axial metal element, and a top end inserted through a second axial metal element, which is mounted in a stepped locating member inside an antenna cap, an insulative sleeve mounted around the top section of the stepped locating member and defining a space on the inside above the top section of the stepped locating member, a matching coil mounted around the stepped locating member and the insulative sleeve and stopped between the bottom section of the stepped antenna and the inside wall of the antenna cap, and a contact terminal fixedly fastened to the top end of the alloy wire rod and moved in the space between a first position in which the antenna terminal disposed in contact with the second axial metal element and the stepped locating member and the mobile telephone antenna is collapsed, and a second position in which the antenna terminal is disconnected from said second axial metal element and the stepped locating member and the mobile telephone antenna is extended out.

2 Claims, 6 Drawing Sheets





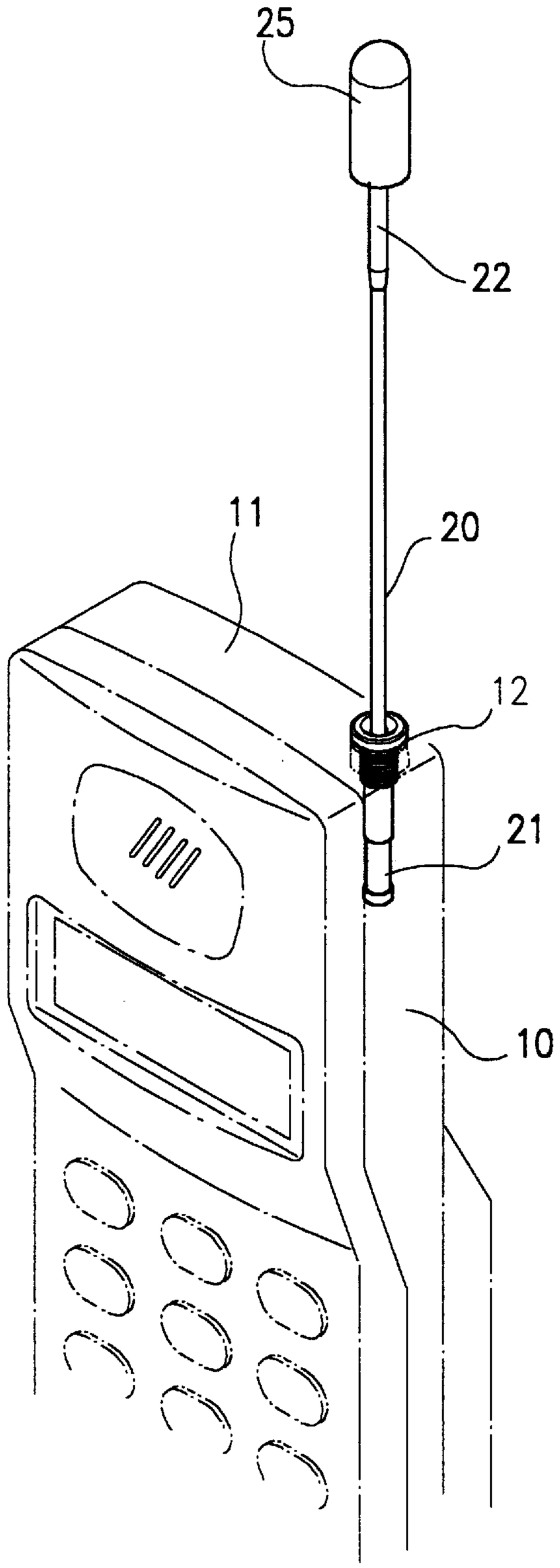


FIG. 1

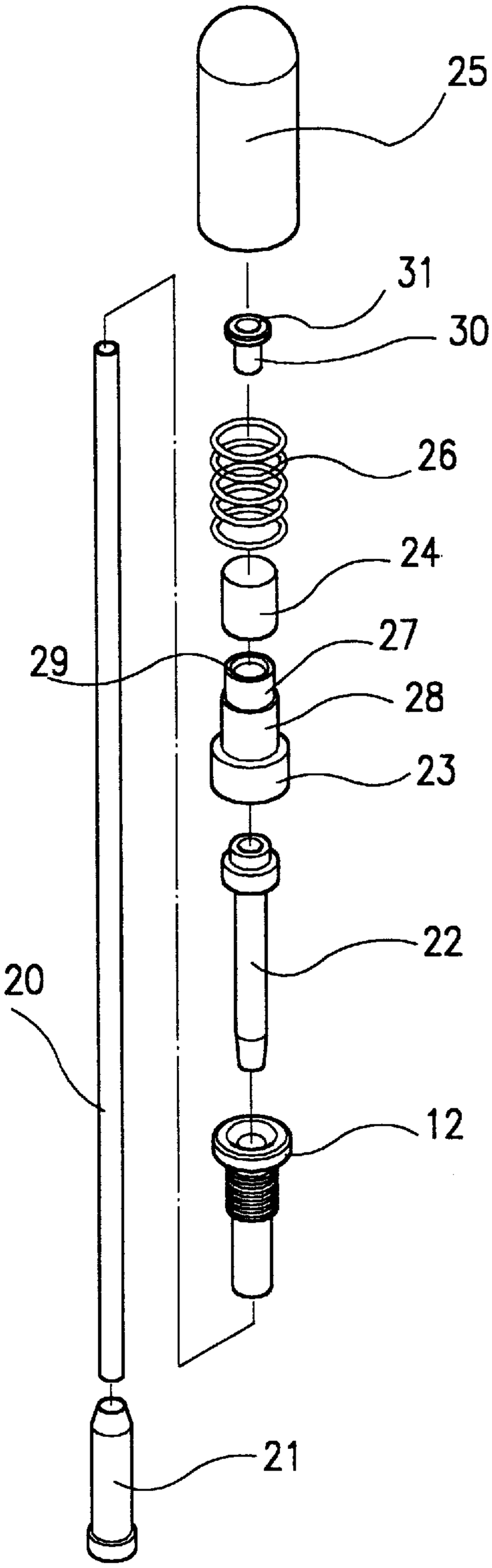


FIG. 2

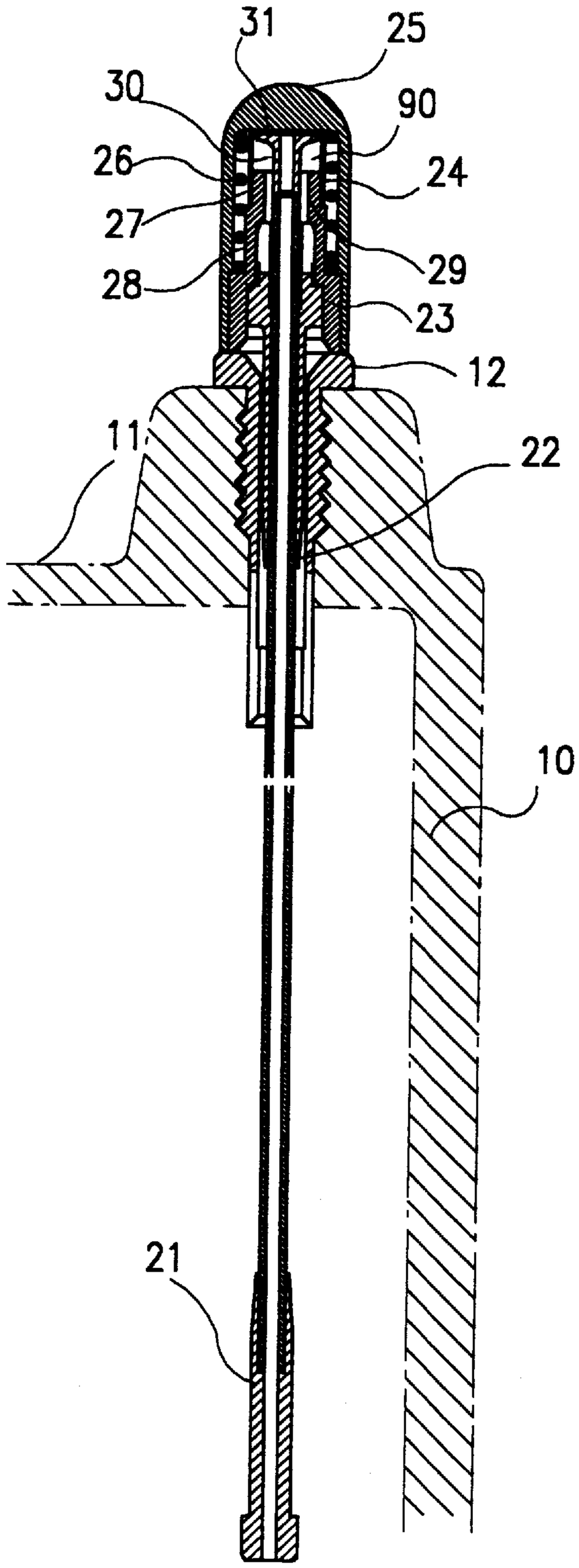


FIG. 3

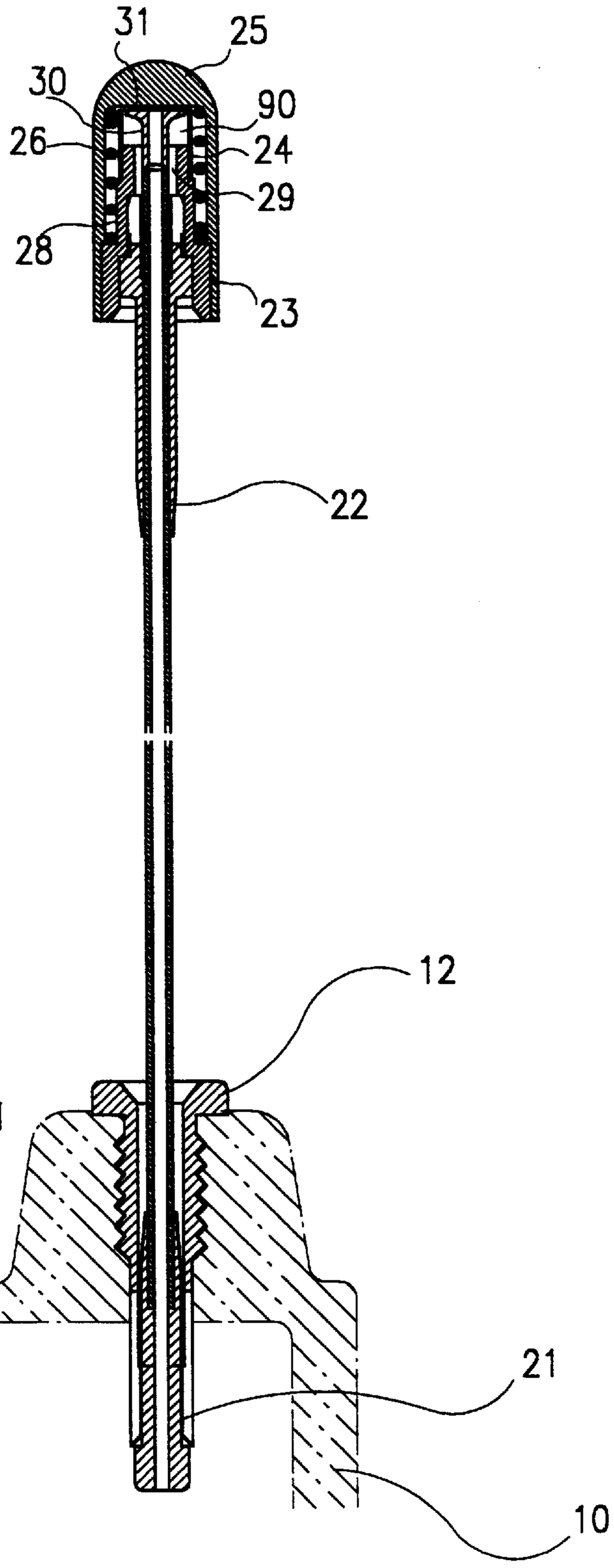


FIG. 4

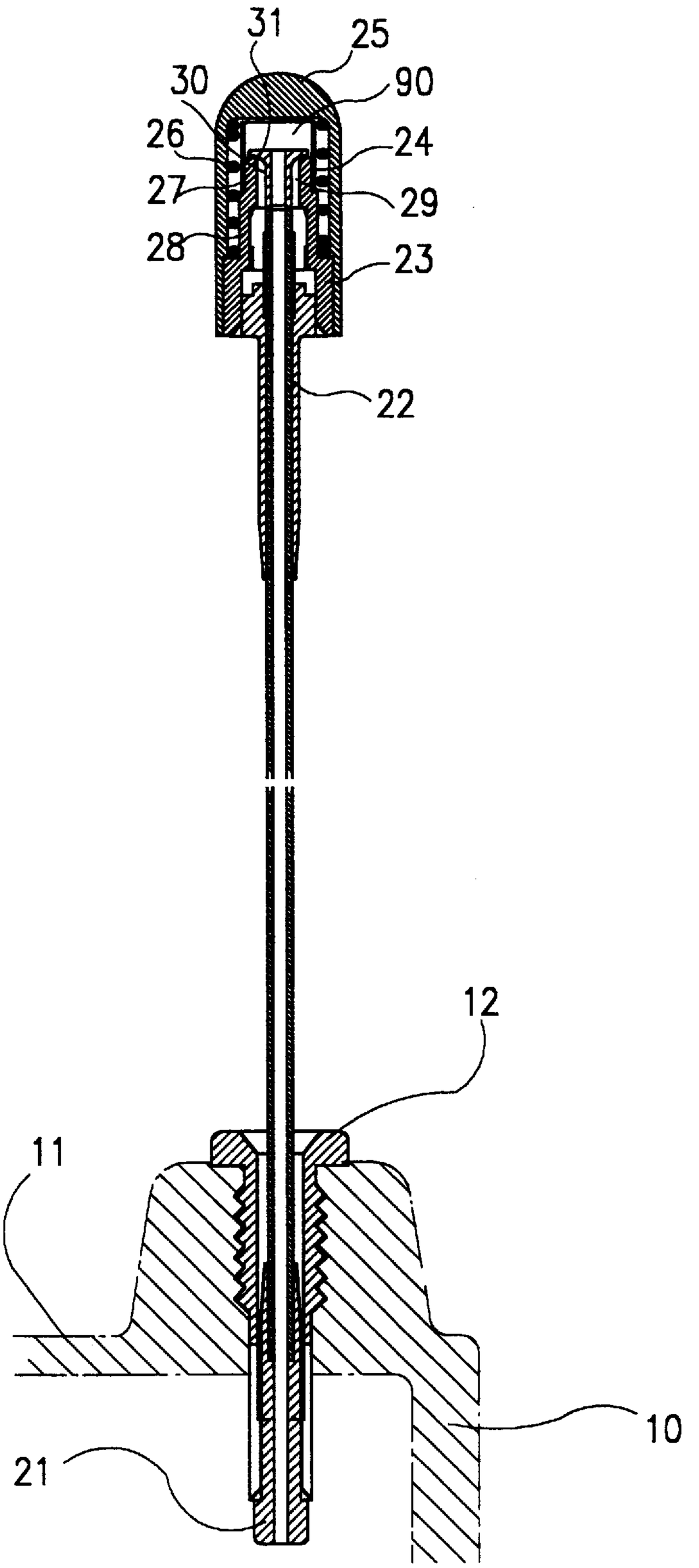


FIG. 5

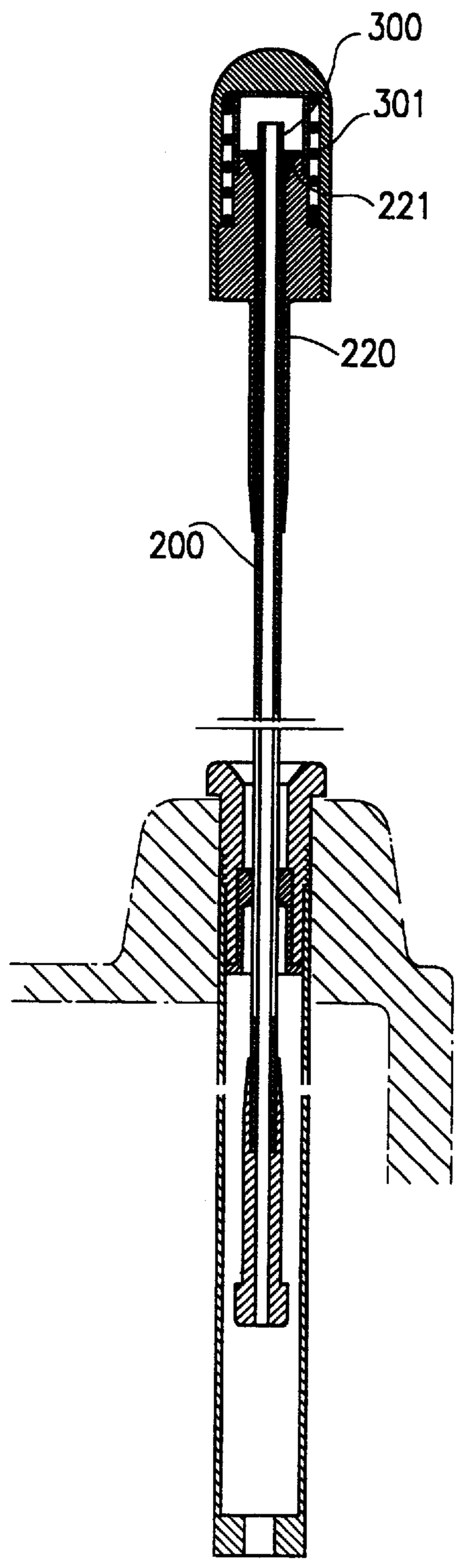


FIG. 6

MOBILE TELEPHONE ANTENNA

BACKGROUND OF THE INVENTION

The present invention relates to mobile telephone antennas, and more particularly to such a mobile telephone antenna which eliminates the interference of outside noise when extended out.

Mobile telephones have been more and more popularly used for the advantage of high mobility. A mobile telephone is generally equipped with a retractable antenna for receiving radio signal. When in use, the retractable antenna is extended out to receive radio signal. When the retractable antenna is extended out, the metal contact bushing of the mobile telephone antenna is disconnected from the metal socket in the mobile telephone, and radio signal transmission between the metal contact bushing of the retractable antenna and the metal socket is achieved by means of the induction of a matching element at the top of the retractable antenna. This signal transmission method tends to be interfered by outside noises.

SUMMARY OF THE INVENTION

The present invention has been accomplished to provide a mobile telephone antenna which eliminates the aforesaid problem. According to one aspect of the present invention, the mobile telephone antenna is mounted in a metal socket in a mobile telephone, comprising an alloy wire rod inserted through the socket and having a bottom end and a top end, a first axial metal element fixedly fastened to the bottom end of the alloy wire rod, an antenna cap, a stepped locating member fixedly mounted inside the antenna cap around the top end of the alloy wire rod, the stepped locating member comprising bottom section, a middle section, and a top section, the diameter of the middle section being bigger than the top section and smaller than the bottom section, an insulative sleeve mounted around the top section of the stepped locating member and defining a space on the inside above the top section of the stepped locating member, a matching coil mounted around the middle section of the stepped locating member and the insulative sleeve within the antenna cap and retained between the stepped locating member and the antenna cap, and a contact terminal fixedly fastened to the top end of the alloy wire rod and moved in the space between a first position in which the antenna terminal disposed in contact with the second axial metal element and the stepped locating member, and a second position in which the antenna terminal is disconnected from said second axial metal element and the stepped locating member.

DETAILED DESCRIPTION OF THE DRAWINGS

FIG. **1** shows a mobile telephone antenna installed in a mobile telephone and extended out according to the present invention;

FIG. **2** is an exploded view of the mobile telephone antenna shown in FIG. **1**;

FIG. **3** is a sectional view of the mobile telephone antenna shown in FIG. **1** when collapsed;

FIG. **4** is similar to FIG. **3** but showing the mobile telephone antenna pulled;

FIG. **5** is similar to FIG. **4** but showing the mobile telephone antenna fully extended out; and,

FIG. **6** is a sectional view of an alternate form of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. **1**, the mobile telephone antenna of the present invention is mounted in a metal socket **12** at the top side **11** of the mobile telephone **10** in one corner.

Referring to FIG. **2**, the mobile telephone antenna comprises an alloy wire rod **20**. The alloy wire rod **20** has a bottom end fixedly mounted with a first axial metal element **21**, and a top end inserted in proper order through the metal socket **12**, a second axial metal element **22** and a stepped locating member **23**. An insulative sleeve **24** is mounted around the stepped locating member **23**. An antenna cap **25** is covered on the stepped locating member **23** and the insulative sleeve **24**. A matching coil **26** is mounted within the antenna cap **25** and retained between the inside wall of the antenna cap **25** and the stepped locating member **23**.

Referring to FIGS. **2** and **3**, the insulative sleeve **24** is mounted around the top section **27** of the locating member **23**. The metal coil **26** is mounted around the middle section **28** of the locating member **23** and the insulative sleeve **24**. The longitudinal length of the insulative sleeve **24** is longer than the top section **27** of the locating member **23**. When the insulative sleeve **24** is installed, a space **90** is defined within the insulative sleeve **24** above the top section **27** of the locating member **23**.

When the top end of the alloy wire rod **20** is inserted through the second axial metal element **22** into the axial through hole **29** of the locating member **23**, a contact terminal **30** is fastened to the top end of the alloy wire rod **20**. The contact terminal **30** has a head **31** disposed outside the top section **27** of the locating member **23** within the space **90**.

Referring to FIG. **3**, when the mobile telephone antenna is collapsed, the second axial metal element **22** and the bottom side of the locating member **23** are disposed in contact with the metal socket **12**, the contact terminal **30** is disconnected from the second axial metal element **22** and the locating member **23**, and therefore radio signal is directly received by the metal socket **12**.

Referring to FIGS. **4** and **5**, when the antenna cap **25** is pulled outwards from the mobile telephone **10**, the alloy wire rod **20** is extended outwards from the metal socket **12** (see FIG. **4**).

When the alloy wire rod **20** is completely extended out, the head **31** of the contact terminal **30** is forced into contact with the top side of the locating member **23** to receive radio signal directly.

FIG. **6** shows an alternate form of the present invention, in which the contact terminal **300** which is fastened to the top end of the alloy wire rod **200** has a bottom cone **301** narrowing towards the bottom side; the second axial metal element **220** and the locating member **23** have a respective tapered top hole **221** adapted for receiving the bottom cone **301** of the contact terminal **300**.

It is to be understood that the drawings are designed for purposes of illustration only, and are not intended as a definition of the limits and scope of the invention disclosed.

What the invention claimed is:

1. A mobile telephone antenna mounted in a metal socket at a top side of a mobile telephone, comprising an alloy wire rod inserted through said metal socket and having a bottom end and a top end, said bottom end being fixedly fastened to a first axial metal element and said top end being inserted through a second axial metal element, an antenna cap, a stepped locating member fixedly mounted inside said antenna cap around the top end of said alloy wire rod, said stepped locating member comprising bottom section, a middle section, and a top section, the diameter of said middle section being bigger than said top section and smaller than said bottom section, an insulative sleeve mounted around the top section of said stepped locating

member and defining a space on the inside above the top section of said stepped locating member, a matching coil mounted around the middle section of said stepped locating member and said insulative sleeve within said antenna cap and retained between said stepped locating member and said antenna cap, and a contact terminal having a head disposed outside the top section of said stepped locating member, said contact terminal being fixedly fastened to the top end of said alloy wire rod and moved in said space between a first position in which said head of said contact terminal is disposed in contact with the top side of said stepped locating member when said mobile telephone antenna is fully extended, and a second position in which said head of said contact terminal is disconnected from said second axial metal element and said stepped locating member when the mobile telephone antenna is collapsed and also when the mobile telephone antenna is collapsed said second axial metal element and said bottom side of said locating member are disposed in contact with said metal socket whereby a radio signal is directly received by said metal socket when said antenna is collapsed and said locating member receives a radio signal directly when said antenna is fully extended.

2. A mobile telephone antenna mounted in a metal socket at a top side of a mobile telephone, comprising an alloy wire rod inserted through said metal socket and having a bottom end and a top end, said bottom end being fixedly fastened to a first axial metal element and said top end being inserted through a second axial metal element, an antenna cap, a stepped locating member fixedly mounted inside said antenna cap around the top end of said alloy wire rod, said stepped locating member comprising bottom section, a

middle section, and a top section, the diameter of said middle section being bigger than said top section and smaller than said bottom section, an insulative sleeve mounted around the top section of said stepped locating member and defining a space on the inside above the top section of said stepped locating member, a matching coil mounted around the middle section of said stepped locating member and said insulative sleeve within said antenna cap and retained between said stepped locating member and said antenna cap, and a contact terminal having a bottom cone narrowing toward said stepped locating member and said stepped locating member having a respective tapered top hole adapted for receiving the bottom cone of said contact terminal, said contact terminal being fixedly fastened to the top end of said alloy wire rod and moved in said space between a first position in which said bottom cone of said contact terminal is disposed in contact with said tapered top hole of said stepped locating member when said mobile telephone antenna is fully extended, and a second position in which said bottom cone of said contact terminal is disconnected from said second axial metal element and said stepped locating member when the mobile telephone antenna is collapsed and also when the mobile telephone antenna is collapsed said second axial metal element and said bottom side of said locating member are disposed in contact with said metal socket whereby a radio signal is directly received by said metal socket when said antenna is collapsed and said locating member receives a radio signal directly when said antenna is fully extended.

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